



SAND CREEK WATERSHED PROJECT



Watershed Management Plan
1999-2009

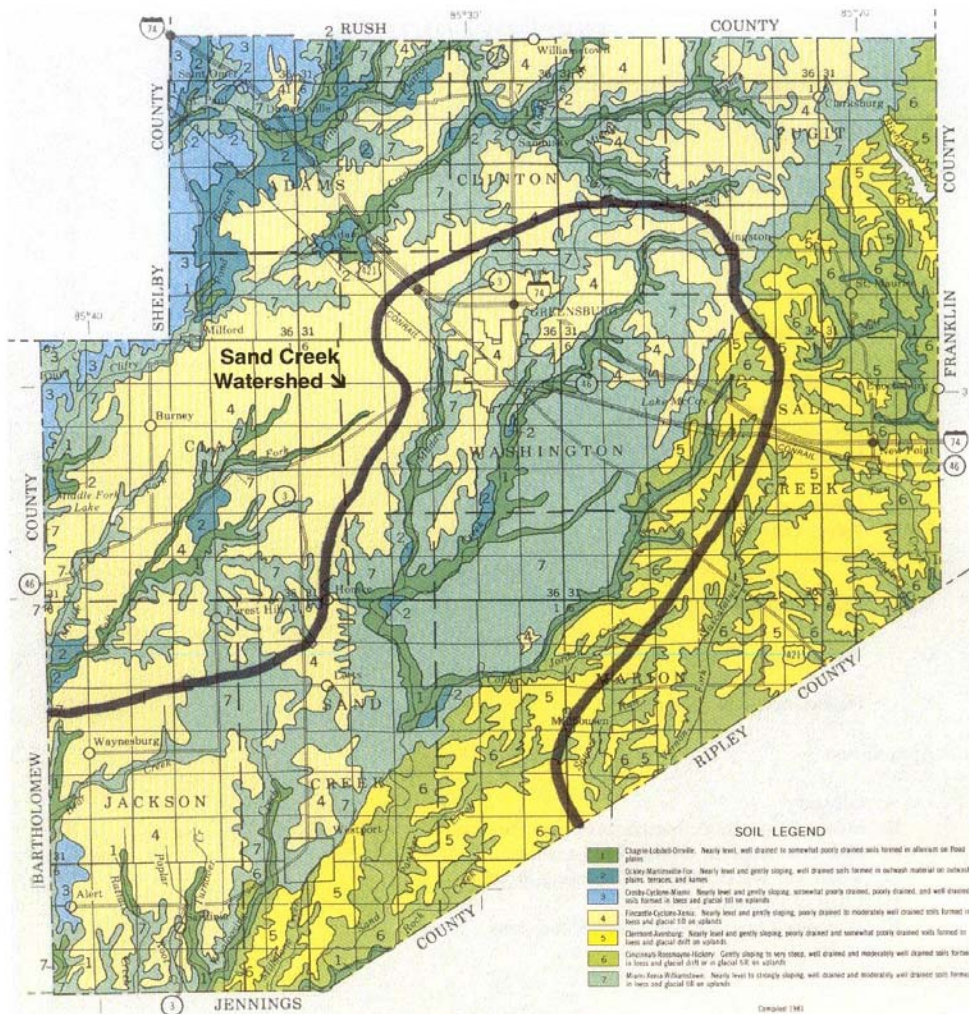
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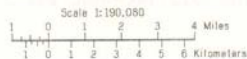
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U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
PURDUE UNIVERSITY AGRICULTURAL EXPERIMENT STATION
INDIANA DEPARTMENT OF NATURAL RESOURCES
SOIL AND WATER CONSERVATION COMMITTEE

GENERAL SOIL MAP DECATUR COUNTY, INDIANA



INTRODUCTION

The Sand Creek Watershed Project is a locally-led planning and educational effort focused on the natural resources of the Sand Creek Watershed. In 1997, community members gathered at a public meeting sponsored by the Decatur County Soil and Water Conservation District (SWCD) to initiate the project. It has remained in the hands of a Steering Committee made up of local farmers, businesspersons, and representatives from city and county agencies and organizations, and has been supported by area businesses and industry as Project Partners.

This document lays out the vision and plan for the future of the Sand Creek Watershed. As human population and activities continue to place more stress on our natural resources, the quality of our water and soil is placed at great risk. As concerned citizens living within the Sand Creek Watershed, we see the need to take action to improve and protect these resources for current and future use. By this action we also enhance and preserve the quality of life for our communities.

Our Vision:

***Clean Water, Full of Life,
Safe and Scenic***



Our Mission:

***Lead the community in ways to improve the
Sand Creek Watershed***

PROJECT BACKGROUND

The Sand Creek Watershed covers 105,540 acres, or 43% percent of the land in Decatur County and is the drainage area for the city of Greensburg and the town of Westport, as well as the small communities of Letts, Sardinia, Alert and Waynesburg. Its 11-digit HUC, or Hydrologic Unit Code (a numbering system for every watershed in the United States), is 05120206030. The land use within the watershed is primarily agricultural with industry based around Greensburg. Sand Creek serves as the primary drinking water source for the town of Westport.

The watershed drains into the main stem of Sand Creek and tributaries including, Muddy Fork, Gas Creek, Cobbs Fork, Panther Creek, Wyaloosing and others. The following lakes are also located within the watershed:

- ✓ The Greensburg Reservoir State Fishing Area Lake (23 acres)
- ✓ The Greensburg City Park Lake (4 acres)
- ✓ Lake McCoy (approximately 33 acres)

Interest in taking action to address the water quality issues of the Sand Creek Watershed was ignited by high fluoride levels found in the water taken in at the Westport Water Treatment Plant as well as concern over excess nitrates, phosphates, and chemicals from farmland and urban runoff. A 319 grant through the Indiana Department of Environmental Management enabled the hiring of a coordinator, and the Steering Committee officially formed in October of 1999. Sub-committees were formed to address technical, educational and financial aspects of the project.

Within the first year of the project, Steering Committee members and project staff began to inventory and gather information on land use and perceived threats or impairments in order to focus their actions. They also concentrated their efforts in the following areas:

Watershed Education: newspaper articles, information brochures and pamphlets, school programs and public presentations.

Water Quality Monitoring: the enlistment of area high school students to assist in monitoring four sites for physical, chemical, and biological indicators of water quality.

Watershed Planning: the development of a comprehensive watershed management plan to address water quality problems in a manner that is acceptable to all stakeholders.

When developing this plan, the Steering Committee considered all the users of the land and water within the watershed in order to take actions that balanced the needs of the many stakeholders. Listed below are the most common uses that impact the water and land resources in the watershed.



The Sand Creek Watershed Project involved community members from many different areas to work on this plan.

Water Body Uses

- ✓ Drinking water for the town of Westport
- ✓ Recreation: fishing, canoeing, and swimming
- ✓ Terrestrial and aquatic wildlife habitat
- ✓ Municipal wastewater discharge (the city of Greensburg and the town of Westport both discharge wastewater from sewage treatment plants into Sand Creek)
- ✓ Industrial processes
- ✓ Livestock

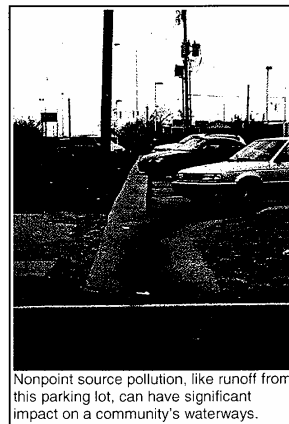
Land Base Uses

The Rural Land Base

- ✓ Crop production
- ✓ Production and care of livestock
- ✓ Timber production and tree farming
- ✓ Private residences and their septic systems
- ✓ Municipal and agricultural waste application
- ✓ Wildlife habitat

The Urban/Suburban Land Base

- ✓ New and existing residential and commercial developments
- ✓ Infrastructure associated with new and existing residential and commercial developments (including roads, parking lots, pipes, etc.)
- ✓ Industrial production
- ✓ Recreation
- ✓ Municipal parks
- ✓ Golf courses



Nonpoint source pollution, like runoff from this parking lot, can have significant impact on a community's waterways.

Water Quality Concerns

Sand Creek is part of the Upper East Fork White watershed, for which the U.S. Environmental Protection Agency (EPA) has listed the following concerns: water quality not being sufficient for designated uses, restrictions on fish consumption, and high wetland losses. The EPA considers this area to be highly vulnerable to aquatic species loss, agricultural runoff and atmospheric deposition (contaminants introduced from the air).¹ Sand Creek is also on the Indiana State Board of Health's *Fish Consumption Advisory List* for several species of fish because of the presence of mercury and/or PCB's in fish samples. (See Appendix C)

The Decatur County Board of Health has observed levels of *E. coli* ranging from 900 colonies/100 mL to 1800 colonies/100 mL (bathing beaches are closed when *E. coli* levels are over 235 colonies/100 mL). High levels of *E. coli* have also been found by volunteer monitors at

¹ This information and more can be found on EPA's Surf Your Watershed website:
<http://www.epa.gov/iwi/hucs/05120206/indicators/indindex.html>.

sites throughout the watershed. The Quality Assurance Project Plan (QAPP) for the volunteer monitoring program and results of testing are in Appendix D.

Runoff or nonpoint source pollution is of critical concern due to excessive levels of sediment, nitrates and phosphates and the possibility of pesticides entering the creek and its tributaries. Nitrate and phosphate levels are usually over the state average, and nitrate is often above the drinking level standard (Appendix D). Atrazine levels exceeding the Surface Water Quality Standard have occurred during periods of heavy rain. See Appendix E for levels of Atrazine, Alachlor and Acetachlor at the Westport Water Treatment Plant for years 1995 through 1999. Excess nutrients and sediment degrade the habitat for aquatic species, while different chemicals and oils present in the runoff could make the water unsuitable as a drinking water source.

The Steering Committee has listed the following as known (k) or suspected (s) sources of pollution within the Sand Creek Watershed. We hope to address as many of these as possible through education and land treatment projects. We also intend to investigate further suspected sources of pollution in order to be better informed of their impact on water quality.

E. coli:

- Residential Septic (k) – Causes: poor maintenance, improper design (type or location)
- Livestock Runoff (s) – Causes: unrestricted access to streams, improper field application of waste

Debris in Creek:

- Illegal Dumping (k) – Causes: lack of knowledge of dumping laws, inconsistent enforcement.
- Flood Debris (s) – Causes: high urban runoff rate

Sediment:

- Agricultural Lands (k) – Causes: low crop residue or vegetative cover, lack of appropriate buffer practices
- Streambanks (k) – Causes: poorly buffered banks, livestock access, flow fluctuations
- Housing/Urban Development (k) – Causes: insufficient erosion control measures installed, rapid urbanization



Getting community members involved in yearly Sweep the Creek events can highlight the issues of illegal dumping and littering while cleaning up Sand Creek.

Nitrogen and Phosphorus:

- Agricultural Lands (s) – Causes: improper application, poor nutrient management, spills
- Residential Septic (k) – Causes: poor maintenance, improper design (type or location)
- Residential Fertilizer Use (s) – Causes: improper application on lawns, gardens, and/or golf courses

Pesticides:

- Agricultural Lands (k) – Causes: improper application, spills, lack of education with regard to alternatives
- Residential Pesticide Use (s) – Causes: improper application on lawns, gardens, and/or golf courses

Fluoride:

- Greensburg WWTP (k) – Cause: discharge from factories

In order to address these concerns and protect the quality of life in the Sand Creek watershed, we have developed the following goals and action plan.

Goal 1:

Improve the natural resources and promote stewardship in the Sand Creek Watershed.

Goal 2:

Inform and educate the Sand Creek Watershed community about preserving, protecting, and conserving the natural resources of this area.

Goal 3:

Develop a stable, long-term organization that will support the activities and programs necessary for project success.

NATURAL RESOURCES/LAND USE

Agriculture

Agricultural land makes up 88,000 acres or 83% of the watershed. Because agriculture is the primary land use in the watershed, nonpoint source pollution from farmland is of major concern when discussing the protection of our water quality. Excess nitrates, phosphates, pesticides and E. coli can be introduced into waterways through poor management of crops and livestock.

Erosion is the largest threat to water and soil quality in our watershed. Not only does it degrade the productivity of our soil, but also excess nutrients and chemicals bonded to soil particles get flushed into our streams through runoff. Sediment in our streams interferes with healthy aquatic plant life and fish. By the time one reaches the bridge at Westport, much of the creek bed is over 75% embedded and heavy silting has occurred. Monitoring has also shown elevated nitrogen and phosphorus levels in the spring and these levels could be tied to agriculture.

According to the 2000 crop transect numbers, approximately 43% of farmland in the watershed is eroding at or above 'T', the tolerable limit of soil loss to ensure continued productivity. Sixteen percent of our farmland is eroding at **three** times the tolerable level (T). The average T for Decatur County is 3.5 tons/acres/year. This means we are losing at least 10 tons/acre/year on 16% of our farmland, and 3.5 – 10 tons/acre/year on the other 27% of fields eroding above T.² Ephemeral gully erosion is also a concern on 40% of the cropland. Erosion can be significantly reduced on cropland through the use of conservation tillage, installing and maintaining healthy buffer strips along waterways, and taking highly erodible land (HEL) out of production.

Table 1: Erosion Rate of Crop Fields, YR 2000

Crop	< 'T'	0-1 'T'	1-2 'T'	2-3 'T'	> 3 'T'
Corn	38%	26%	7%	7%	21%
Soybeans	80%	4%	4%	2%	10%

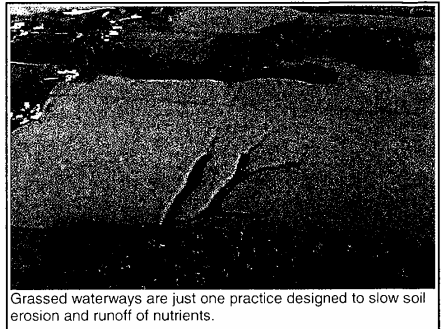
¹T' = tolerable limit of erosion at which nature can reproduce soil sustainable for production

Conservation tillage leaves at least 30% crop residue cover on the field at planting time and includes no-till in which the ground is not tilled or cultivated. Leaving adequate residue on the soil will reduce runoff, allowing the water to better infiltrate to plant roots, and will increase the organic matter in the soil. Transition from traditional tillage systems can be difficult, but farming costs may decrease and long-term soil health is greatly improved. If the proper support and incentives are made available to producers, we can significantly increase the amount of acres in conservation tillage in the watershed. Inventory/assessments show that increased conservation tillage is needed throughout the watershed, especially on corn acres. An incentive plan that would pay farmers (in a corn-bean rotation) for three years of no-till corn could result in up to six total years of no-till. No-till for soy beans is already a widely accepted practice, so additional

² Based on Universal Soil Loss Equation

incentives may not be needed for those years of the rotation.

Buffer strips are areas of land along field edges or waterways planted in permanent grass or trees. This vegetation filters runoff and traps sediment and pollutants before they enter water. Filterstrips, contour strips, riparian buffers (consists of trees, shrubs and grasses) and grassed waterways are all different kinds of buffers that can be installed to reduce erosion and runoff. Government programs, such as the Conservation Reserve Program (CRP), offer financial and technical assistance to farmers to install buffer strips and take HEL areas out of production.



Assessments of aerial photos and driving inventories of the watershed currently show that Section A in northern part of the project area (see map and description in Appendix F) has the most need of buffer areas along streams. There are critical areas in other sections but these are not as concentrated as in Section A. Marketing filterstrip programs and creating other incentives will be initially focused in Section A and progress downstream from there.



Livestock operations can have negative impact on water quality in other ways. Improper manure management can lead to an increase in fecal matter introduced into Sand Creek and its tributaries. Livestock are an important part of our agricultural production in Decatur County. There are approximately 7,000 head of cattle and 65,000 head of hogs in the watershed, and not all operations are large enough to be regulated by the State. We need to encourage and support proper nutrient management, specifically the process of storage and disposal of animal waste. Manure management is important to reduce the amounts of harmful bacteria and excess nitrogen and phosphorus making their way into waterways used for fishing and recreation. Severe streambank erosion is another problem incurred where livestock have free access to streams.

Once again, assessments of the watershed show that livestock access to the stream seems to be most visible in Section A, with smaller critical areas in other sections. Projects to fence livestock away from streams and provide alternative water sources would help address some of the impact in these areas.

In order to work with landowners on implementing conservation practices that will help improve water quality and the overall health of our natural resources, the project needs more staff to meet with landowners, market various programs, and assist with the planning and design of individual projects. Hiring a Watershed Technician to assist SWCD/NRCS and other project

staff in implementing conservation practices is critical to the success of the project.

In order to improve and protect soil and water resources, the Steering Committee has developed the following objectives and actions designed to increase the knowledge and use of best management practices on the farmland in our watershed.

Objective 1: Enable the Decatur Co. SWCD and other project partners to handle increased workload involved in implementing natural resource objectives.

Action(s)	Who	When
Develop job description for Watershed Technician	Coordinator, SWCD, Steering Committee	Summer 2001
Using 319 funds, hire Watershed Technician	SWCD	October 2001

Objective 2: Improve water and soil quality through education and promotion of best management practices on our agricultural lands.

Action(s)	Who	When
Provide a minimum of six newsletter/paper articles per year on agricultural water quality issues.	Watershed Tech, Coordinator	Through 2003
Through the course of the project, provide 5 field days/seminars covering agricultural BMP's, including: <ul style="list-style-type: none">• Nutrient management• Pest management (insects/weeds)• Conservation buffers	Coordinator, SWCD, Watershed Tech	Through 2009

Objective 3: Apply filterstrips/riparian buffer to remaining 9 miles of streambank that has inadequate buffer area.

Action(s)	Who	When
Apply for LARE/319 funding (supplemental to CRP cost-share)	Coordinator, SWCD	Jan. 31 st , 2002, 2003
Market CRP/LARE programs through personal letters, newsletters, radio	Watershed Tech	Through 2009

Objective 4: Increase conservation tillage in watershed area from 24,000 acres to 36,500 acres (more than 50% increase) through 2009.

Action(s)	Who	When
Provide 4 conservation tillage field days	Coordinator, SWCD, Watershed Tech	By 2009
Provided No-till Panel Discussion on local radio station	Coordinator, veteran no-till farmers	March 2000
Annual No-till social event for area farmers to network regarding no-till practices	Watershed Tech, veteran no-till farmers	2001-2009
Apply for cost-share funds from LARE, EQIP, and 319 programs to provide landowners further incentives to increase conservation tillage.	Coordinator, SWCD, Steering Committee	LARE: Jan. 31 st , 2002 EQIP 319: March 2000
Publicize results of annual Crop Residue Transects in appropriate media, emphasizing the relationship between acres of conservation tillage and predicted soil loss. Connect to water quality.	Watershed Tech, SWCD	On-going

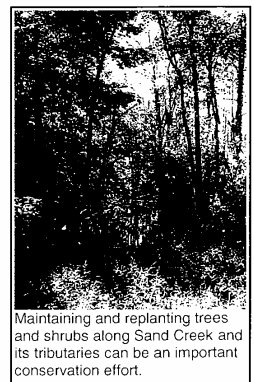
Objective 5: Apply 30 miles of grassed waterways to address ephemeral/gully erosion by 2004 (10 miles are already under contract).

Action(s)	Who	When
Assist NRCS staff in implementing federal programs	Watershed Tech, SWCD	October 2001 to September 2003
Market CRP/LARE programs through personal letters, newsletters, radio	Watershed Tech	Through 2003

Woodlands

Woodlands are a very valuable natural resource of the Sand Creek watershed. Woodlands play a direct or indirect role in everyone's lives as well as the whole environment. Besides being the largest oxygen producers on the earth, woodlands protect and improve water quality.

Woodlands provide wildlife habitat, wood products, firewood, mushrooms, and places to hunt, hike and camp. They reduce noise and clean the air. Their benefits appear countless.



Woodlands occupy approximately 15% or 16,000 acres in the watershed. For the most part, wooded parcels are scattered throughout the watershed and located along Sand Creek and its tributaries in the southern watershed area.

The majority of woodlands are owned privately. Assisting landowners by providing them with resources to improve their woodlands through forestry best management practices (BMP's) will help enhance a significant part of the watershed, as well as reap financial benefits for the landowner. Woodlands are a renewable resource; proper management provides the landowner an excellent economic return while keeping all the benefits listed earlier. One well managed hardwood forest study showed a yield increase of \$184/acre/year in the timber value, with the timber volume nearly doubling in twelve years.¹

Another study showed \$183/acre/year through fourteen growing seasons. The harvested tops brought in an additional \$16,000 in firewood sales.² A study on a Decatur county woods that has been intensively managed for 20 years shows an annual compound rate of 18.3%³

Our plan is to further the education and implementation of tree planting, timber stand improvement and more riparian areas (woodlands along the banks of streams and rivers) to landowners on a voluntary basis. Through the Sand Creek watershed project partnership, technical and financial assistance will be offered. Programs available are the Classified Forest Program, USDA Conservation Reserve Program, and the 319 grant program.

Objective 1: Educate woodland owners on the economic and environmental importance of sustainable forest land.

Action(s)	Who	When
Hold a field day for woodland owners	Watershed Tech	By 2003
Articles in newsletter/newspaper	Watershed Tech	2 articles/yr
Develop Woodland Information/Management booklet specific to the Sand Creek Watershed	Coordinator	By October 2001

Objective 2: Seek funds to assist landowners in the development of timber management plans that include BMP's and timber stand improvement.

Action(s)	Who	When
Apply for Stewardship Challenge grant	Coordinator, SWCD	Annually

³ Marshal County Mill Pond Demonstration Woodland 1999 Report

⁴ Wakeland Forestry Consultants; The Luke Woods, 1996

⁵ ABC Forest Management; Raver Farms, 1999

Objective 3: Provide financial assistance on 50 acres of tree planting by 2009.

Action(s)	Who	When
Apply for 319/LARE funds for tree planting on critical areas	Coordinator, SWCD	319—2003 LARE—annually

Objective 4: Increase number of woodland acres enrolled in the Classified Forest Program from 930 acres to 1180.

Action(s)	Who	When
Market the program through field days, articles, mailings and personal contact	Watershed Technician/ SWCD	By 2006

Wildlife and Fisheries

The terrain immediately adjacent to Sand Creek and its tributaries provides a good portion of Decatur County's wildlife habitat. In many places, this area provides ample water and more vegetative cover for food and shelter than elsewhere in the watershed. However, in some places, development or row crops extend right up to the creeks leaving little or no habitat. As one moves farther from the existing riparian corridors along the creek and stream banks, the amount and diversity of the habitat decreases. As pressures from increased suburban/urban development and more intensive cropping of farmland continue, we may see greater negative impacts on wildlife habitat in both size and diversity.

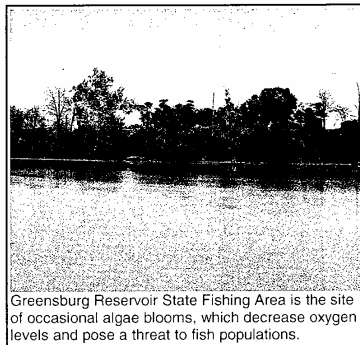
Currently, concerns are focused on improving quail and rabbit habitat. Much of their habitat was lost when fencerows on farmland were taken out and this has had a negative impact on their populations. The populations of many other species such as deer, geese and turkey seem to be stable or flourishing. The Department of Natural Resources does list a few state-endangered species for Decatur County. These include: the Bachman's sparrow, the Great Blue heron, the bobcat, and the American badger. On the other end of the spectrum, the beaver populations have grown to a point that they are considered a nuisance species in some areas.

The federal Conservation Reserve Program (CRP) and Wildlife Habitat Improvement Program (WHIP) provide us avenues by which to address the wildlife habitat improvement within the watershed. In both of these programs, marginal farmland is taken out of production. On WHIP land, incentives are paid to implement land treatments that will restore or improve wildlife habitat. With CRP land, the incentives are aimed at taking marginal land out of production, but we can strongly encourage plantings that will provide enhanced wildlife habitat as well as erosion control. Currently there are approximately 106 acres of WHIP and CRP land in the watershed that can be considered high quality wildlife habitat.

Fishing is an important recreational activity in the Sand Creek watershed. Fishery areas in the watershed include the 23-acre Greensburg Reservoir State Fishing Area, the 4-acre City Park Lake, Sand Creek and its tributaries. Protecting and enhancing the quality of aquatic life in the watershed provides valuable recreation opportunities and enhanced quality of life.

A 1994 IDNR Fish Management Report for Sand Creek (compiled by Fisheries Biologist Larry Lehman) indicated adequate water quality for the diversity of species present but states a need for restoration and improvement of riparian areas to ensure the continued health of the current fish populations. Volunteer monitoring of macroinvertebrates on the main stem of Sand Creek and three tributaries indicates fair to good water quality for aquatic life.

Species of fish present in the watershed (both stocked and naturally occurring) include: small- and large-mouthed bass, bluegill, white suckers, redear sunfish, channel catfish, common carp, black and white crappie, and yellow bullheads. The 2000 Indiana Fish Consumption Advisory has placed restrictions of varying degrees on black redhorse, spotted sucker, white sucker, yellow bullhead and large-mouth bass (Muddy Fork) species because of mercury and/or PCB contamination.



Objective 1: Provide at least two educational events and seek financial resources to promote and improve wildlife habitat in the watershed.

Action(s)	Who	When
Provide two Wildlife Habitat Workshops	Coordinator, Watershed Tech	March 2000, 2003
Publish at least one news article per year educating the public on wildlife issues within the watershed	Watershed Tech	Through 2009

Objective 2: Increase CRP/WHIP acreage for which the primary purpose is to benefit wildlife from present level of 100 acres to 250 acres by 2005. *

Action(s)	Who	When
Promote continuous and general CRP and WHIP programs at field days, personal letters, newsletters, radio	Coordinator, SWCD/NRCS staff	Through 2005

* Includes acreage in any CRP practice where high quality wildlife cover was selected.

Recreation

Outdoor recreation is a very important component to the quality of life in a community. Decatur County has less than 500 acres of public outdoor recreational areas available to its residents. One hundred thirty acres is the statewide average of recreation acres per 1000 people, and the county average is just 10 acres per 1000 people.⁴ Facilities within the watershed include the Greensburg City Lake and Park, the Greensburg Reservoir, the Westerkamp Property (80 acres), and parks and playgrounds in most of the smaller communities.

As a whole, Decatur County lacks outdoor recreation opportunities that utilize our natural resources such as fishing and public access areas on Sand Creek, hiking trails and natural areas for education and recreation. Access to water recreation is also limited by full body contact restrictions because of poor water quality. The improvement and preservation of Sand Creek will provide more recreational opportunities, such as hiking, canoeing, fishing, bird-watching, etc. In particular, the area around the dam on Sand Creek, near the town of Westport, is a prime location for an enhancement project that will improve recreational opportunities for the Sand Creek community and southern Decatur County.

Objective: Partner with Town of Westport to develop/enhance the recreational opportunities at the dam area on Sand Creek.

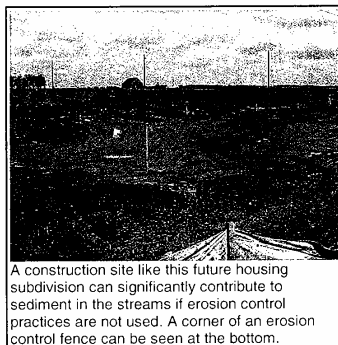
Action(s)	Who	When
Plan scope of project in cooperation with the Town of Westport.	Coordinator	Fall 2001-Spring 2002
Seek funding, in-kind donations and manpower from local businesses and organizations to complete improvements	Coordinator/Steering Committee	Spring 2002-Fall 2003

Urban Issues

The geographic scope of this project covers the Sand Creek watershed only within Decatur County. While the land use is primarily agricultural (83%), the two largest urban areas of the county, the City of Greensburg and the Town of Westport, are also located in the watershed. About 7,000 acres in the watershed can be considered residential/urban—including high-density housing, commercial, industrial and low-density housing. The impact of activities taking place in these areas contribute significantly to both the point source and non-point source (NPS) pollution, therefore we must raise awareness of urban as well as agricultural water quality issues.

⁶ Figures taken from the Indiana Statewide Comprehensive Outdoor Recreation Plan (SCORP), Executive Summary 1994-1999.

In terms of population, 69% of Decatur County residents live in the Sand Creek watershed. Using 1996 population figures from the IUPUI Education website³, the total population of the watershed is approximately 17,300 (based on township populations), and almost 70% of these are residents of Greensburg or Westport. A critical aspect to these population figures is that Greensburg saw a 9% population increase between 1990 and 1996. While this increase in urban residents is not as fast as in other areas of the state, it does indicate significant growth and growth usually corresponds with increased development.



Development can have direct negative impacts on water quality through increased erosion when the ground is disturbed during construction and increased runoff from impervious surfaces (roads, parking lots, buildings). Runoff from impervious surfaces channels contaminants like oils, salts and other chemicals directly into surface water. This increased runoff can contribute to flooding and slower regeneration of ground water. Other urban/residential non-point source pollution (pollution that cannot be traced to a single point, like a pipe) includes chemicals and fertilizers applied to lawns and golf courses, litter and debris, and dumping into storm drains.

In general, as populations increase, there is greater pressure on existing resources—whether they are natural resources such as open land and suitable drinking water or related infrastructure such as community water treatment plants or individual septic systems. It is important that decisions regarding development and land use are proactive regarding the protection of water and land resources. This is why increased awareness of urban water quality issues is vital to the success of our project.

Objective: Implement storm drain marking program that will cover 75% of the storm drains in Greensburg and Westport.

Action(s)	Who	When
Write letters to the Mayor of Greensburg and the Town Council of Westport requesting cooperation with the activity.	Steering Committee /Coordinator	March 2001
Order supplies	Coordinator	April 2001
Recruit youth groups and volunteers from area organizations	Coordinator	March 2001
Apply markers to drains	Coordinator/Volunteers	Summer 2001 & 2002

³ [Http://www.iupui.edu/it/ibrc/Population/CITYEST/allcities.html](http://www.iupui.edu/it/ibrc/Population/CITYEST/allcities.html)

EDUCATION

Public Outreach

A key component to the Sand Creek Watershed Project is public outreach. Addressing water quality/conservation concerns from a watershed approach affects everyone living within the watershed boundaries, and great effort must be made to ensure involvement from all sectors of the community. A primary function of this project is to increase public awareness of impairments to the health of the watershed and our quality of life, as well as solutions that will conserve and protect.

Objective 1: To increase readership of the Sand Creek Notes from 1850 to 3500 by 2002.

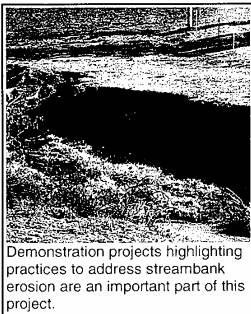


Volunteer helps mark storm drains in Greensburg to raise awareness of urban pollution issues.

<u>Action(s)</u>	<u>Who</u>	<u>When</u>
Increase mailing list by gathering names at civic meetings and project-sponsored workshops/field days and from organizations such as the Greensburg Chamber of Commerce and The Independent Westport Area Business Association .	Coordinator	On-going
Secure funding from sponsors and grants to cover increased costs.	Coordinator	On-going

Objective 2: To build a successful outreach program on water quality issues.

<u>Action(s)</u>	<u>Who</u>	<u>When</u>
Provide at least 12 media releases by newspaper or radio per year	Coordinator, Watershed Tech	Monthly
Put up printed signs and displays in high traffic areas and at public events	Coordinator	On-going
Create a library of education resources for use by our target audiences	Coordinator	Sept. 1999 to Sept. 2001
Make/obtain 3-D tabletop model of the Sand Creek Watershed projects for use in educational programs	Coordinator	November 2001



Objective 3: Develop and present programs to demonstrate good watershed management practices.

<u>Action(s)</u>	<u>Who</u>	<u>When</u>
Provide field day every two-three years discussing septic system maintenance and latest alternative technologies (3 field days total)	Coordinator/Technical Committee/Health Dept.	2002 to 2009
Develop and implement a stream bank stabilization demonstration area	Coordinator, Watershed Tech, Technical Committee	April 2002 to September 2003
Hold 2 workshops on water quality/conservation and non-point urban pollution	Coordinator, Watershed Tech	Sept. 2001 to June 2003

Objective 4: Hold a yearly clean up event on Sand Creek or tributaries.

<u>Action(s)</u>	<u>Who</u>	<u>When</u>
Organize a "Sweep the Creek", enlisting volunteers from throughout the watershed community.	Coordinator	Annually

Objective 5: Continue gathering information on water quality impairments in the watershed to further inform and update the Sand Creek community on current water quality issues.

<u>Action(s)</u>	<u>Who</u>	<u>When</u>
Identify high risk non-point source areas (i.e. failing septic systems, golf courses) through various monitoring / inventory efforts	Coordinator, Health Depts.	On-going

Schools

Often conservation efforts come down to changing mindsets and habits formed over a lifetime. This is why education, especially at early ages is such an important part of environmental stewardship. By giving teachers and students the knowledge and tools they need to form strong stewardship ethics and practices, we have a greater chance for real, long-term change. When we demonstrate the connections between our actions and impacts on water quality, we can encourage the students to make good choices in their lives now. We also set the foundation for future leaders to make wise environmental decisions.

The students in the Sand Creek watershed are spread through four schools, Greensburg, North Decatur, and South Decatur Community Schools, and St. Mary's Catholic School. Our plan is to target elementary school classes with comprehensive watershed education programs. Students from the high schools have been enlisted to assist in our volunteer water-monitoring program through Hoosier Riverwatch (see Appendix D). We will also seek to involve extracurricular groups when possible, such as Girl Scouts or Boy Scouts and Little Hoosiers.



Students from the Greensburg HS Ecology Club look for macroinvertebrates that will help assess the current aquatic community.

Objective 1: Provide at least 400 student hours per year of water quality/conservation education using a watershed approach.

Action(s)	Who	When
Develop a watershed approach activities manual for teachers to use in area classrooms	Coordinator	September 2001
Implement a watershed education program in all schools in the Sand Creek Watershed	Coordinator	October 1999 to August 2003
Collaborate with area schools to implement watershed education program at outdoor labs	Coordinator/Watershed Tech	October 2001 to Sept. 2003
Seek funding to create financial awards to support teachers who develop solid conservation/water quality education programs for their students.	Coordinator/ Educator	October 2001 to Sept. 2003

Objective 2: Implement water quality monitoring programs and record data at four different sites within the watershed.

<u>Action(s)</u>	<u>Who</u>	<u>When</u>
Monitor four sites on a monthly basis using Hoosier Riverwatch Volunteer Stream Monitoring Manual in cooperation with area high school students	Coordinator/ Certified Monitors	October 1999 to December 2009
Send data to Hoosier Riverwatch/ put in database	Coordinator/ Certified Monitors	October 1999 to December 2009
Obtain and replenish HACH monitoring kits through 2003 for participating groups	SWCD	October 2000 to September 2003

ORGANIZATIONAL

Currently the Sand Creek Watershed Project has a strong, active Steering Committee and adequate funding for staff and basic project implementation. However, to ensure program success, we must find ways to build and keep community involvement on all levels and secure funding for projects through 2009. Both people and money are critical resources for our organizational stability.

Objective 1: Seek financial resources to support staffing, activities and programs.

<u>Action(s)</u>	<u>Who</u>	<u>When</u>
Develop funding strategy/targets	Grant/Financial Subcommittee	On-going
Build relationships with local/regional funding organizations	Coordinator, Steering Committee	On-going

Objective 2: Encourage participation in committee/sub-committee activities and programs.

<u>Action(s)</u>	<u>Who</u>	<u>When</u>
Recruit key individuals for each sub-committee	Coordinator, Subcommittees	On-going

REFERENCES

2000 Indiana Fish Consumption Advisory. Prepared jointly by the Indiana Department of Natural Resources, the Indiana State Department of Health, and the Indiana Department of Environmental Management, Indianapolis, IN.

Indiana Agricultural Statistics 1999-2000. Compiled by the Indiana Agricultural Statistic Service, West Lafayette, IN.

Logging and Forestry BMP's for Water Quality in Indiana—Field Guide. Published by the IDNR, Division of Forestry, Indianapolis, IN.

Project CLEAR Steering Committee. Northern Laughery Creek Watershed Management Plan. Project CLEAR, Versailles, IN.

ACCOMPLISHMENTS

1999-2000

- Formed steering committee; established vision and mission for the project.
- Identified current concerns or impairments to the health of the watershed.
- Set scope of the project, including initial goals and objectives.
- Cleaned up historic illegal dumpsite, 'Little Africa', with the help of Best Way of Indiana, Decatur County Highway Department and Indiana Conservationists Unite.
- Held first Wildlife Workshop.
- Organized 2 *Sweep the Creek* events, involving around 100 volunteers and gathering over 5 tons of trash.
- Increased readership of newsletter to 3200 people.
- Made presentations were made to many community organizations, including the Greensburg City Council, Greensburg Water Board, Greensburg Optimists Club, Greensburg Lions Club, the Business and Professional Women's Club, the Chamber of Commerce, the Greensburg Rotary Club and The Independent Westport Area Business Association.
- Established a volunteer water-monitoring program with the cooperation of area high school teachers and students.

2001

- Completed the Sand Creek Watershed Management Plan.
- Held "Nutrient Management Workshop" for farmers and producers in the watershed.
- Brought 5-week watershed education series to 3rd grade classes in Greensburg Community School system
- Sponsored 2nd annual Sweep the Creek.
- Initiated storm drain marking project and covered over 100 drains in the Greensburg area.
- Participated in No-Till/Wildlife Field day hosted by the Decatur County SWCD.

APPENDIX A—Glossary

BMP: best management practice

Conservation Tillage: method of tilling the soil that leaves at least 30% of the previous crop's residue on soil surface after planting that current crop.

CRP: Conservation Reserve Program, a federal incentive program that promotes the installation of various conservation practices on agricultural land.

E. coli: a bacterium of the intestines of warm-blooded animals, including humans, that is used as an indicator of the possible presence of disease producing organisms.

EQIP: Environmental Quality Incentives Program, a federal program that provides technical and financial assistance to address conservation practices in designated priority areas.

Eutrophication: a process by which oxygen is severely depleted in a body of water as the result of the rapid growth then die-off of algae or other aquatic plants.

Filterstrips: vegetated areas designed to catch sediment and other pollutants running off of erodible soils.

FIP: Forestry Improvement Program, financial assistance program aimed at timber stand improvement.

Flouride: a mineral that can occur both naturally in the soil and water and can be present in discharge from certain industries. It is also often added to drinking water in small amounts to fight tooth decay, but exposure to large amounts can contribute to bone disease.

Grassed waterways: gently sloped trenches, planted with grass, that help slow down runoff and absorb excess water and any eroding soil.

HEL: highly erodible land

IDEM: Indiana Department of Environmental Management, the state regulatory agency on environmental issues.

IDNR (DNR): Indiana Department of Natural Resources

LARE: Lake and River Enhancement, a grant program through the Indiana Department of Natural Resources.

Nitrogen (or nitrates): a nutrient needed in moderate amounts by plants and animals. Excessive amounts of nitrogen can cause algal blooms, which lead to depleted oxygen levels in the water. The drinking water standard for nitrogen is 10 ppm or less.

Nonpoint source pollution: a type of pollution whose source is not readily identifiable as any one particular point, such as pollution caused by runoff from streets or agricultural land.

No-till planting: method of farming where the soil is not tilled and seeds are planted without turning the soil.

NRCS: Natural Resources Conservation Service, a federal agency that provides technical assistance for conservation programs

Phosphorus: an essential plant nutrient that, in excessive amounts, can contribute to eutrophication.

Point source pollution: pollutants originating from a specific or “point” source, such as a pipe, vent or culvert.

Riparian: an area adjacent to the bank of a stream, river, pond or other water body.

RMZ: Riparian Management Zone, a buffer strip next to a stream, river, pond or other water body.

T-value: the tolerable limit of erosion above which nature cannot reproduce soil fertile enough for sustainable production.

SWCD: Soil and Water Conservation District, a local agency that provides assistance with soil and water conservation issues

Watershed: all the land area that drains into a particular body of water.

WHIP: Wildlife Habitat Incentives Program, a voluntary federal program for landowners who want to develop and improve fish and wildlife habitat on their land.

WWTP: waste water treatment plant

APPENDIX B—
Steering Committee Members / Project Partners

Steering Committee:

- Bob Dawson, Farmer
- Bob Hauser, Decatur Co. Rural Water
- Clifford Byard, Westport Town Board
- Dan Markham, Greensburg Daily News
- Darrell Breedlove, District Forester
- Debbie Martin, Project Treasurer
- Dennis Weber, Decatur C. Rural Water
- Don Yager, Farmer- Farm Bureau
- Nicole Wolff, Decatur Co. Health Dept.
- Ed Baumgartle, KOVA Fertilizer
- John Dwiggin, Jr., Wildlife Educator
- Max Maudlin, Farmer
- Peg Polanski, Attorney/Riparian Landowner
- Steve Delph, District Conservationist
- Tom Menkedick, Farmer-County Commissioner
- Toni Collins, Union Bank & Trust Co.

Supporting Agencies:

- Decatur County Soil and Water Conservation District (SWCD)
- Indiana Department of Environmental Management (IDEM)
- Natural Resource Conservation Service (NRCS)
- Decatur County Farm Service Agency (FSA)
- Indiana Department of Natural Resources (IDNR)

**Sand Creek Watershed
Water Quality Monitoring Program**

The following Project Partners have sponsored our efforts in many different ways and we appreciate their support.

- Computer Solutions Inc.
- Wal Mart
- South Decatur High School - Natural Resources Class
- Greensburg High School – Ecology Club
- North Decatur High School
- ABC Forest Management
- Jackson Office Equipment
- Delta Faucet
- Delta Faucet—Indianapolis
- Greensburg Daily News
- GECOM Corporation
- Best Way of Indiana
- 5/3 Bank
- McLean Screenprinting
- Paul R. Nahmias, D.D.S.
- Witkemper Insurance Group
- First Federal
- Pepsi
- Greensburg Rotary Club
- The Independent Westport Area Business Association
- Union Bank & Trust
- NTN Corporation
- O'Mara Foods, Inc.
- 5K Corporation
- Decatur County REMC
- Evans Beef
- Farm Credit Services
- Hilliard Lyons
- Rust Wholesale
- Staples
- Baltus Electronics
- Westport Dairy Queen
- State Farm Insurance
- Don Meyer Ford
- KB Specialty Foods
- Langeland Farms
- Obermeyer & Young
- Green Signs Company
- Hubers Locker
- Vanderbur's Greenhouse
- Medical Multi-Specialty Clinic
- Greensburg Fraternal Order of Police
- KOVA
- ReMax
- Decatur Developmental Industries
- MASCO Supply Services
- River Valley Resources
- Scout Troop 573
- Chamber of Commerce

APPENDIX C—Fish Consumption Advisory Information

The following are excerpts from the 2000 Indiana Fish Consumption Advisory publication

SUMMARY

Don't stop eating fish. It is a good source of protein that is low in saturated fat. You can maximize the benefits and minimize the risk of eating contaminated fish by following the fish advisory to help you make informed choices about:

- what types of fish you eat,
- where you fish,
- how you prepare fish for cooking, and
- how to moderate the amount and frequency of fish you consume.

Fish are good for you and are good to eat. But some fish may take in contaminants from the water they live in and the food they eat. Some of these contaminants build up in fish and you over time. These contaminants could harm you, so it is important to keep your exposure to these contaminants to a minimum by following the fish advisory. The advisory helps you plan what fish to keep as well as how often and how much sport fish you should eat. This advisory is not intended to discourage you from eating fish, but it should be used as a guide to reduce your risk of eating contaminated fish.

Long-lasting contaminants such as polychlorinated biphenyls (PCBs), DDT, and mercury build up in your body over time. It may take months or years of regularly eating contaminated fish to build up to amounts that are a health concern. Health problems, which may result from the contaminants found in fish, range from small changes in health that are hard to detect, to birth defects and cancer. Mothers who eat highly contaminated fish for many years before becoming pregnant may have children who are slower to develop and learn. The meal advice in this advisory is intended to protect children from those potential developmental problems. Adults are less likely to have health problems at the low levels that affect children.

Group 1—Unrestricted consumption. One meal per week for women who are pregnant or breastfeeding, women who plan to have children, and children under the age of 15

Group 2—One meal per week (52 meals per year) for adult males and females. One meal per month for women who are pregnant or breastfeeding, women who plan to have children, and children under the age of 15.

Group 3—One meal per month (12 meals per year) for adult males and females. Women who are pregnant or breastfeeding, women who plan to have children, and children under the age of 15 do not eat.

Group 4—One meal every 2 months (6 meals per year) for adult males and females. Women who are pregnant or breastfeeding, women who plan to have children, and children under the age of 15 do not eat.

Group 5—No consumption (DO NOT EAT)

**2000 INDIANA FISH CONSUMPTION ADVISORY
STREAMS AND RIVERS**

Location	Species	Fish Size (inches)	Contaminant	Group
All Indiana Rivers and Streams				
<i>All Counties</i> (unless otherwise specified)	Carp	15-20	■○	3
		20-25	■○	4
		25+	■○	5
Sand Creek				
<i>Decatur County</i>	Black Redhorse	14+	○	2
	Northern Hogsucker	10-12	■	3
		12+	■	4
	Spotted Sucker	13-14	○	2
		14+	○	3
	White Sucker	8-11	○	2
		11+	○	3
	Yellow Bullhead	10-12	■	3
		12+	■	4
	<i>Jennings County</i>	Rock Bass	6-9	○
9+			○	3
Spotted Bass		8-12	○	2
		12+	○	3
Yellow Bullhead		8-11	○	2
		11+	○	3
Muddy Fork of Sand Creek				
<i>Decatur County</i>	Black Redhorse	12-15	○	2
		15+	○	3
	Largemouth Bass	6-11	■	3
		11+	■	4
	Northern Hogsucker	6-10	■	3
		10+	■	4
	White Sucker	10-13	○	2
		13+	○	3

○ = Mercury
■ = PCBs

Group 2 = 1 meal/week
Group 3 = 1 meal/month
(Women and children see advisory groups on page 10)

Group 4 = 1 meal/2 months
Group 5 = DO NOT EAT

APPENDIX D—Volunteer Water Quality Monitoring Program

11-Digit HUC: 05120206-030

START DATE: October 1999

QAPP: ARN—98-104 (Approved by IDEM 10/29/99)

SUMMARY:

The Sand Creek Watershed Project began monitoring four sites in October and November of 1999. The initial coordinator, Brian Ingmire submitted a Quality Assurance Project Plan (QAPP)¹ to IDEM and enlisted the help of three area high school classes in monitoring three of the sites. There was a short lapse in monitoring during the summer of 2000, while the project was without a coordinator. The current coordinator, Andrea Bongen, resumed the testing in October of 2000. Monitoring is planned to continue through 2003.

METHOD:

Advanced chemical (HACH), physical and biological testing are carried out according to Hoosier Riverwatch (HR) guidelines and our QAPP. There is always a Level II certified monitor present during sampling.

TRAINING: The coordinator and two of the three high school teachers involved received Level II certification under the HR program. Some students also received level I or II certification. At the beginning of each semester, the coordinator spends up to three class periods instructing students on water quality issues and testing methods.

DATA REPORTING:

The new Hoosier Riverwatch database came on line in November of 2000. All current tests results are entered directly into the database, which can be searched and viewed by anyone with Internet access. Original data sheets are still kept on file at the Decatur Co. SWCD. Old data is still in the process of being entered.

¹ The QAPP outlines all methods and procedures of the Sand Creek monitoring program and is on file at the Decatur County SWCD office.

**Sand Creek Watershed
Water Quality Monitoring Program**

Site 1 (HR site #68)—Muddy Fork

HUC: 05120206-030-030

Lon: 85 deg 30 min 53 sec W

Lat: 39 deg 21 min 4 sec N

Intersection of Muddy Fork and C.R. 100 North

Results:

Date	CQHEI*	PTI**	WQIR***	Flow-cfs	Dissolved Oxygen-ppm, % Sat	E. Coli-col/mL	pH	BOD5-mg/L	Temp Δ	Phosphate, Total-mg/L	Nitrate-mg/L	Turbidity-NTU's
10/19/99			78	.64	12.1, 115%	100	8	—	1	.2	4.4	—
11/12/99			65	—	10, 85%	600	8.5	3	-1.1	0.6	8.8	—
3/15/00			56	5.74	16.5, 135%	1000	6.7	3.7	.5	.9	50.6	—
5/15/00		12	53	11.42	11, 130%	900	7.9	2.8	.5	2.3	75.2	—
11/1/00	57	25	71	21.2	13, 122%	475	8.3	1	0	.2	30.8	—
12/05/00			58	—	15.5, 117%	25	8.1	1.5	—	.13	30.8	—
2/20/01	52	20	53	6.9	14, 130%	4500	8	0	—	.24	30.8	—
3/28/01			61	2.36	17.5, >140%	75	8.3	3	—	.15	22	—
4/18/01	55	11	68	6.01	16, 130%	8	8.3	1	—	.8	40	—
5/23/01			65	6.36	12.5, 125%	330	8.1	1.5	—	.3	33	—
6/8/01			79	37.05	10.5, 110%	0	7.8	2.5	—	.35	35	—

*** Citizens Qualitative Habitat Index—Hoosier Riverwatch method for assessing physical characteristics; there is no rating scale for results at this time.**

**** Pollution Tolerance Index —Hoosier Riverwatch rating for macroinvertebrate sampling: 23 or more is Excellent, 17-22 is Good, 11-16 is Fair, 10 or less is Poor.**

***** Water Quality Index Rating—Hoosier Riverwatch rating of chemical test results: 90%-100% is Excellent, 70%-90% is Good, 50%-70% is Medium, 25%-50% is Bad, <25% is Very Bad.**

**Sand Creek Watershed
Water Quality Monitoring Program**

Site 2 (HR site #71)—Gas Creek

HUC: 05120206-030-010

Lon: 85 deg 29 min 14 sec W

Lat: 39 deg 19 min 25 sec N

On property of Dan Roach, 850 S C.R. 60 SW

Results:

Date	CQHEI*	PTI**	WQIR***	Flow-cfs	Dissolved Oxygen-ppm, % Sat	E. Coli-col/mL	pH	BOD5-mg/L	Temp Δ	Phosphate, Total-mg/L	Nitrate-mg/L	Turbidity-NTU's
10/28/99			59		9, 93%	1200	7.8	3.5	.5	1	65.8	—
12/2/99			63		8.25, 80%	3000	8.2	—	8.5	2	61.6	—
12/7/99			45		9, 87%	3800	8.8	3.5	8.8	4	59.4	—
1/15/00			51		10.5, 93%	1400	7.8	3.2	8.4	13	48.4	—
2/12/00			51		7, 58%	1200	8.1	2.5	4	1.3	31.5	—
3/11/00			51		8.5, 80%	1200	8.75	—	2	1.8	39.6	—
4/8/00			51		14, 130%	12000	7.8	—	3	3.2	35.2	—
5/18/00			60		9, 105%	1100	7.6	2.1	1	2.1	44.1	—
10/7/00	81		63		10, 105%	5860	7.9	—	5	1.45	3.96	—
11/11/00		19	56	31.7	8.3, 76%	4250	7.8	3	4	4.6	3.1	—
12/9/00			62	—	9.7, 82.3%	—	7.3	1.67	5	4.3	4.4	—
2/10/01			63	—	10.7, 98%	300	7.6	3	8	2.4	3.52	—
3/10/01		9	57	11.93	8.3, 68.3%	1266	7.5	1	2	3.5	18	—
4/7/01			64	21.48	9.5, 95%	1071	7.7	3.67	4.5	3.5	1.5	—
5/5/01	83	15	59	10.44	6.3, 63%	—	7.7	2.67	-2	5	23	—
6/16/01			72	13.86	9, 100%	0	7.8	6	—	2	16	—

*** Citizens Qualitative Habitat Index—Hoosier Riverwatch method for assessing physical characteristics; there is no rating scale for results at this time.**

**** Pollution Tolerance Index —Hoosier Riverwatch rating for macroinvertebrate sampling: 23 or more is Excellent, 17-22 is Good, 11-16 is Fair, 10 or less is Poor.**

***** Water Quality Index Rating—Hoosier Riverwatch rating of chemical test results: 90%-100% is Excellent, 70%-90% is Good, 50%-70% is Medium, 25%-50% is Bad, <25% is Very Bad.**

**Sand Creek Watershed
Water Quality Monitoring Program**

Site 3 (HR site #116)—Cobbs Fork

HUC: 05120206-030-060

Lon: 85 deg 31 min 14 sec W

Lat: 39 deg 13 min 47 sec N

Intersection of Cobbs Fork and C.R. 60 SW

Results:

Date	CQHEI*	PTI**	WQIR***	Flow-cfs	Dissolved Oxygen-ppm, % Sat	E. Coli-col/mL	pH	BOD5-mg/L	Temp Δ	Phosphate, Total-mg/L	Nitrate-mg/L	Turbid NTU
10/21/99			71		15.5, 137%	100	8	—	.7	.14	13.2	—
11/4/99			74		12, 109%	100	8.3	2.5	1	.14	11	—
2/7/00			77		15.5, 90%	20	7.8	2.2	1	.18	13.2	—
3/9/00			63		15.5, >140%	50	7.8	2.1	1	.2	50.6	—
4/10/00			86		11.5, 110%	0	7.5	—	2	.2	13	—
5/20/00			78		8.5, 95%	20	7.3	1	1	.2	36	—
10/25/00			63	14.98	8, 93%	50	7.4	.5	0	.05	6	—
2/1/01	61	7	77	42.69	13, 96%	57	7.9	2	—	.05	.7	63
3/14/01			73	38.04	16, 120%	50	8.3	2	—	.05	8	40
4/30/01			60		13.5, >140%	1039	8.3	4	—	.2	3	—
5/10/01		15	74	24.38	13, 140%	150	7.6	4	—	0	1	0
6/22/01			67	58.33	10, 110%	0	8.1	5	—	.8	>44	80

*** Citizens Qualitative Habitat Index—Hoosier Riverwatch method for assessing physical characteristics; there is no rating scale for results at this time.**

**** Pollution Tolerance Index —Hoosier Riverwatch rating for macroinvertebrate sampling: 23 or more is Excellent, 17-22 is Good, 11-16 is Fair, 10 or less is Poor.**

***** Water Quality Index Rating—Hoosier Riverwatch rating of chemical test results: 90%-100% is Excellent, 70%-90% is Good, 50%-70% is Medium, 25%-50% is Bad, <25% is Very Bad.**

Water Quality Monitoring Program

Site 4 (HR site #69)—Sand Creek

HUC: 05120206-030-030

Lon: 85 deg 32 min 44 sec W

Lat: 39 deg 10 min 0 sec N

At covered bridge, just north of C.R. 1100 S and Sand Creek intersection

Results:

Date	CQHEI*	PTI**	WQIR***	Flow-Cfs	Dissolved Oxygen-ppm, % Sat	E. Coli-col/mL	pH	BOD5-mg/L	Temp Δ	Phosphate, Total-mg/L	Nitrate-mg/L	Turbidity-NTUs
11/10/99			74	6.96	12.5, 115%	0	8.9	2.5	0	1	19.8	—
12/7/99			75		16.5, 123%	0	8.5	2.5	1.1	.8	22	—
3/10/00		17	64	9.67	15.5, 142%	0	8	3.2	1	1.3	44	—
5/20/00			61	23.27	12, 135%	200	8.1	2	0	1.5	33	—
10/12/00	47		71		11, 113%	100	8.5	1	—	.54	22	—
11/29/00			59		18, 140%	250	8.4	2	—	.48	30.8	—
2/28/01			65		17, 135%	541	8.5	1.5	—	.28	15.25	—
3/30/01			76		14, >115%	66	8.6	0	—	.08	11	—
4/30/01			—		16.5, >140%	396	8.4	—	—	.35	9	—
5/29/01			68		11, 120%	198	8.3	1	—	.3	30	—
6/22/01			67		10, 110%	0	7.9	6	—	1.5	13	100

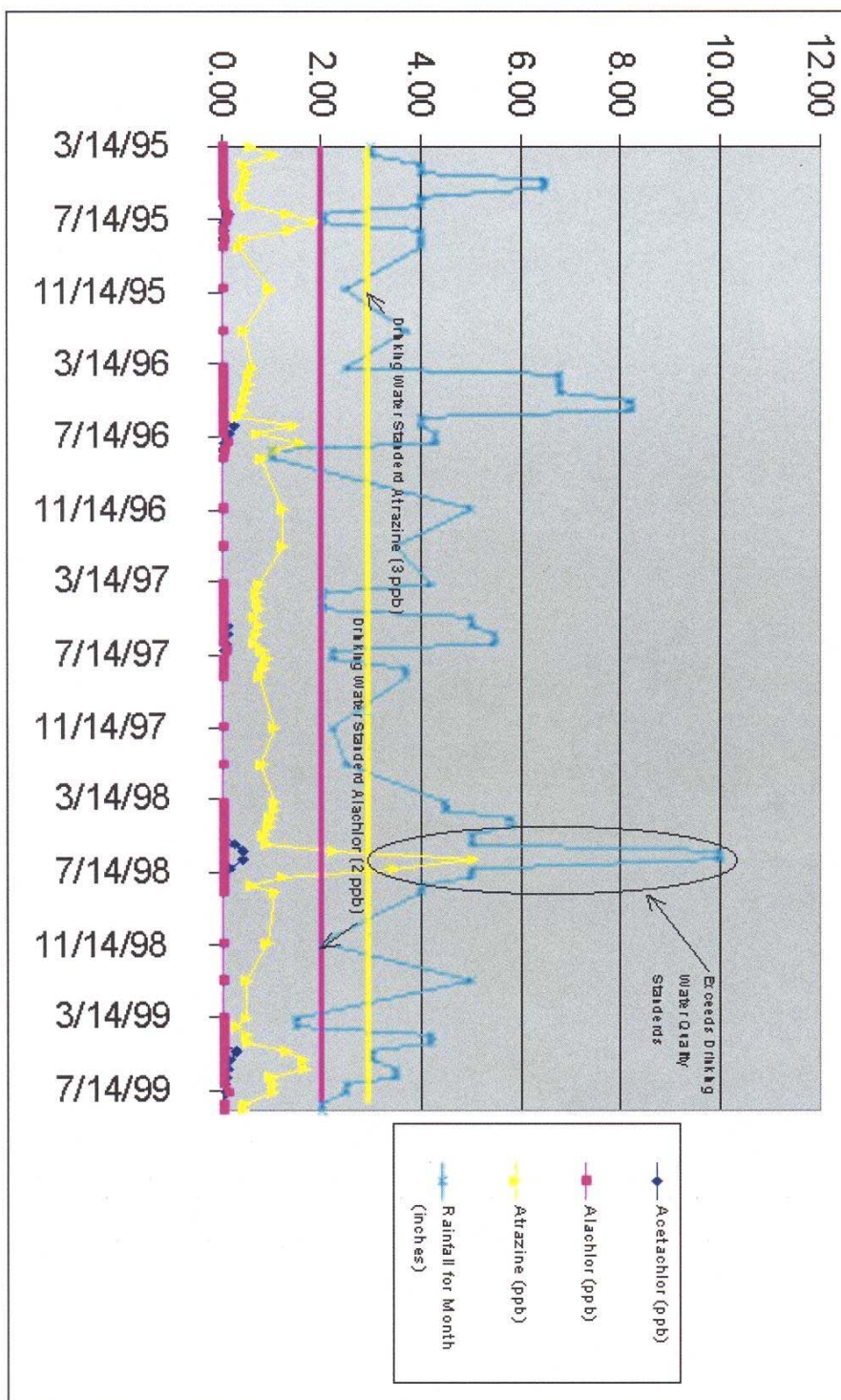
*** Citizens Qualitative Habitat Index—Hoosier Riverwatch method for assessing physical characteristics; there is no rating scale for results at this time.**

**** Pollution Tolerance Index —Hoosier Riverwatch rating for macroinvertebrate sampling: 23 or more is Excellent, 17-22 is Good, 11-16 is Fair, 10 or less is Poor.**

***** Water Quality Index Rating—Hoosier Riverwatch rating of chemical test results: 90%-100% is Excellent, 70%-90% is Good, 50%-70% is Medium, 25%-50% is Bad, <25% is Very Bad.**

APPENDIX E—Chart of Pesticide Levels

Surface Water Concentration of Significant Herbicides in Sand Creek at Westport,
Indiana. Adopted from Monsanto Study No. 94-27-R-3



APPENDIX F—Watershed Inventory

The assessment of the following areas was completed through windshield surveys and aerial photo assessment during the spring and summer of 2001.

Section A

This area encompasses the headwaters of Sand Creek, Cobb's Fork and Muddy Fork in the northern part of the Sand Creek watershed. Land use is agriculture for soybean and corn production along with cattle and an at least one small-scale hog producer. There is very little conservation tillage, especially on some of the rolling hills just south of the community of Kingston. We observed around a third to half of the soybean fields were no-tilled but only one no-till cornfield. Several examples of gully erosion were found near 350 E between the head of Sand Creek and Cobb's Fork. We calculate there is a potential need for approximately 9 waterways in this section and about 22,800 feet of filterstrips or buffers along the streambanks.

In several pasture areas, there is evidence of cattle and hog access to streams and along much of the streambank, moderate to severe bank erosion is present. Just east of Kingston there is a project with one landowner underway to fence livestock away from the streambank, with funding provided by a Water Quality Improvement Grant from the State.

Section B

The central section of the watershed, extending from just below Greensburg to around County Road 800S encompasses the lower halves of Muddy and Cobb's Forks and Gas Creek and the middle portion of Sand Creek. Traveling south, the land becomes much more hilly and forested. While still mostly agriculture with row crops, there are more small residential parcels and woodland areas than the northern section. Riparian zones are much wider and more numerous as well. Assessment suggests that there is the potential for 22,000 feet of filterstrips in this section.

Areas of concern include at least one site where hogs have access to the streams and there is some erosion present, and a few construction sites with no erosion control measures in place. (One site in particular had high erosion potential.)

Section C

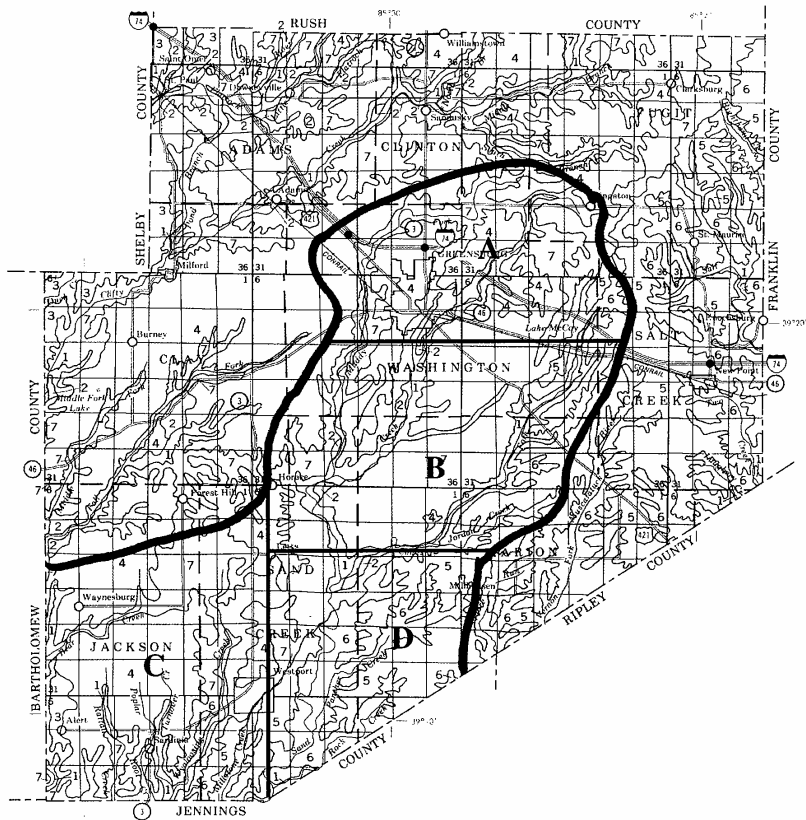
The area covers the headwaters of Bear, Rattail and Wyaloosing creeks, which join Sand Creek in Jennings County. Like the rest of the watershed, crops are mainly corn and soybeans and the land is flat to gently rolling hills. Much of the stream banks have adequate buffer in this area, except for one portion along the western tributary of Wyaloosing. There is potential for 24,000 feet of filterstrip in this area.

Section D

This is the small, southern most section of the watershed, including the main stem of Sand Creek, Panther and Jordan Creeks. It is heavily wooded in comparison to the rest of the watershed. There seems to be adequate buffer on most of the stream banks in this area.

**Sand Creek Watershed
Water Quality Monitoring Program**

Map of Inventory Sections



Stream Assessments--Site I

Background: April 26, 2001. Sunny with temperatures around 70 degrees. It rained approximately 4 or 5 days ago, which was approximately .3 of an inch. Location: Co. Rd. 500 South to 600 South, section 5 on Forest Hill topographical map. Water temperature 56 degrees Fahrenheit. Inventory completed by Andy Ertel, Jim Dunaway and Andrea Bongen.

This stream and riparian site appears to be in good quality. The channel appears to change in substrate 4 different times within 1 ½ miles surveyed. The stream has a pool-riffle sequence with approximately *twenty* different riffle areas. There is green algae on the limestone substrate areas and on many of the rock riffle areas. There are no large vascular plants located within the stream. Sediment (sand) bars have formed closer to the bridge at Co. Rd. 600 South

Wildlife seem well represented; observed were numerous water snakes, minnows, fingerlings, 10-14" bass, and 18" suckers throughout the segment. Canada geese, mallard and wood ducks were also present.

The area has a number of different wildflowers scattered within the vegetation. The stream banks are in good condition. Some banks are protected by a species that appears similar to rushes. Past stream bank erosion problems were addressed by placing large concrete pieces in numerous spots. One poured concrete structure still exists in good condition protecting the county road. Closer to Co. rd. 600S, limestone riprap has been placed on approximately 200 feet of stream bank very recently.

Three bags of trash, one mattress, and a chair have been thrown either in the stream or within the vegetation area along the stream. Smaller pieces of trash are scattered throughout the segment, but not excessive.

Three field tile outlets are located in the channel banks. One outlet pipe has fallen off, due to stream flow and erosion.

Suspected impairments within this segment are **nutrients** and **sediment**.

Site II:

Background: May 1, 2001. Sunny day temperatures around 75 degrees. Rained approximately 10 days ago, which was approximately .3 of an inch. Location: section 23 and 26 on Greensburg topographical map. Inventory completed by Andy Ertel, Jim Dunaway and Kathleen Hagen.

The stream section scored in the **good** category using the stream visual assessment protocol technique. The channel bottom was limestone with green algae attached to the substrate. The stream has a pool-riffle effect. There is a limestone ledge approximately three feet in height that helps oxygenate the water. The area was well vegetated which provides a canopy over the stream and reduces temperatures in the summer time. Stream grade appeared to be 1 to 2 percent. Water clarity was clear.

The stream supports a variety of fish from minnows and small catfish to small mouth bass. Red-winged black birds, snakes, and a large hawk were sited in the segment area.

As the stream migrates south the limestone begins to disappear, larger pools and less riffles occur and the channel widens. More sandy deposits form, algae is not present and the flow slow down. Stream bank erosion is minimal.

Located on the bank is an old axle with two tires attached.

Suspected impairments within this segment are **nutrients** and **sediments**.

Summary: These assessments should be done again in the summer. These areas appear to be in good to excellent condition and provide excellent habitat for a variety of aquatic and terrestrial wildlife. Grassed filter and more riparian buffers could enhance the areas even more and minimize any additional sediment loads.

Watershed Inventory (windshield survey)

Location: Washington township area (northeast headwaters).

Spring 2001 has been a dry and above temperatures year. The cropland fields are either no-till or chisel, field cultivator, planter systems (however, little to no residue). On some cropland fields where the rainfall runoff concentrates, a gully or cutting back is occurring at the creek location. The vegetation along the creeks within the cropfields are minimal in many areas, ranging 3 to 8 feet.

There are approximately 3 to 4 cattle operations on pasture with accessibility to the creek for a water supply. On this warm day, cattle were present in the creek. Ditch bank erosion ranges from very little to moderate concern.

Did not see any effluent problems from septic systems. For the most part, houses are distant from each other.

Summary: Increased implementation of conservation tillage, filter strips, possible nutrient management, livestock exclusion, and alternative water sources would increase the potential for better water quality and protect the soil resources. Conservation planning and technical assistance on individual farms would create a more in depth inventory of critical areas.